

## **AMENDMENTS TO THE DRAWINGS**

The attached replacement sheets of drawings includes changes to Figures 1 and 4.  
The replacement sheets replace the original sheets on file.

Attached: Replacement Sheets (2 sheets)

## **REMARKS**

Claims 1-70 are pending in the application. Claims 1-70 are rejected.

Amendments to the application are shown above. The Applicant respectfully requests reconsideration of the application in view of the amendments and the following remarks.

### **Information Disclosure Statement / Duty to Disclose**

The Examiner cited a document authored by the inventors of the present application (“Robust Bayesian Mixture Modelling”, ESANN 2004). The Examiner notes that the references cited in the document were not considered.

The Applicant has filed an IDS with this response that includes the references cited in the document “Robust Bayesian Mixture Modelling”, ESANN 2004.

### **Drawings**

The Office Action states that Figure 1 and 4 should be designated as --Prior Art-- because only that which is old is illustrated (distribution curves and a computer system, respectively).

Figures 1 and 4 have been amended to show designation “Prior Art.” The replacement sheets are attached. Accordingly, the Applicant respectfully requests that the drawing objections be withdrawn.

### **Claim Rejections under 35 U.S.C. 101**

**Claims 1-70 are rejected under 35 U.S.C. 101** because the claimed invention is directed to non-statutory subject matter. The Office Action states that the claims merely recite a software algorithm, *per se*, and therefore do not produce a useful, tangible, and concrete result. Software *per se* is not considered concrete under MPEP 2106.

Claim 1 has been amended to recite “outputting the probability density.” The Applicant submits that amended claim 1 recites a useful, tangible, and concrete result. Independent claims 14, 27, 39, 50, and 61 have been amended similarly as claim 1. Accordingly, the Applicant respectfully requests that the § 101 rejections be withdrawn.

**Rejections under 35 U.S.C. 112**

Claims 7, 20, 32, 45, 56, and 66 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the **enablement requirement**. The Office Action states that the claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Office Action states that as per claim 7, 20, 32, 45, 56, and 66, the specification fails to comply with the written description requirement because it does not properly disclose “labeling parameter.” The Applicant assumes that this rejection was mistakenly placed under the enablement rejections and is a repeat of the written description rejection to “labeling parameter” of paragraph 6.2 of the Office Action.

Claims 7, 20, 32, 45, 56, and 66 have been cancelled.

As per claims 12, 25, and 37, the Office Action states that the claims fail to enable “determining a correct number of speakers from the probability density modeling the input set of data.”

Claims 12, 25 and 37 have been amended to remove “determining a correct number of speakers from the probability density modeling the input set of data.”

As per claims 13, 26, and 38, the Office Action states that the claims fail to enable “input set of data represents image segmentation data from images having regions of different characteristics.”

Claims 13, 26, 38 have been amended to remove “having regions of different characteristics.”

In view of the above claim amendments, the Applicant submits that the instant § 112P1 rejections as to the enablement requirement have been overcome. Accordingly, the Applicant respectfully requests that the enablement requirement rejections be withdrawn.

**Claims 1-70 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.**

As per claims 1-70, the Office Action states that the specification does not explain what makes an approximation “tractable.”

The Applicant submits that when the term “tractable” is read in context with the phrase “tractable approximation,” the written description requirement of §112P1 is met.

As per claims 7, 20, 32, 45, 56, and 66, the Office Action states that the specification fails to comply with the written description requirement because it does not properly disclose “labeling parameter.”

Claims 7, 20, 32, 45, 56, and 66 have been cancelled.

As per claims 12, 25, 37, the Office Action states that the specification fails to comply with the written description requirement because it does not reasonably disclose in accordance with 35 U.S.C. 112, first paragraph, how “determining a correct number of speakers from the probability density modeling the input set of data” is performed.

Claims 12, 25 and 37 have been amended to remove “determining a correct number of speakers from the probability density modeling the input set of data.”

As per claims 13, 26, and 38, the Office Action states that the specification fails to comply with the written description requirement because it does not reasonably disclose in accordance with 35 U.S.C. 112, first paragraph, “input set of data represents image segmentation data from images having regions of different characteristics.”

Claims 13, 26, 38 have been amended to remove “having regions of different characteristics.”

In view of the above claim amendments, the Applicant submits that the instant § 112P1 rejections as to the written description requirement have been overcome.

Accordingly, the Applicant respectfully requests that the written description requirement rejections be withdrawn.

**Claims 1-70 are rejected under 35 U.S.C. 112, second paragraph,** as being incomplete for omitting an essential step of establishing a result of performing the method, or the claimed system performing its method.

Claim 1 has been amended to recite “outputting the probability density.” The Applicant submits that amended claim 1 recites a result. Independent claims 14, 27, 39, 50, and 61 have been amended similarly as claim 1. Accordingly, the Applicant respectfully requests that the rejections to omitting an essential step of establishing a result of the method or system performing the method by withdrawn.

**Claims 1-70 are rejected under 35 U.S.C. 112, second paragraph,** as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention.

The Office Action states that the term “satisfactorily optimized” in claims 1, 2, 14, 15, 27, 39, 40, 41, 50, 51, 52, and 61 is a relative term that renders the claims indefinite, and that the term “satisfactorily optimized” is not defined by the claims or the specification.

Independent claims 1, 14, and 27 have been amended to recite “determining if the lower bound has been satisfactorily optimized, wherein the lower bound is satisfactorily optimized when the computed lower bound has changed less than a threshold amount from a previously computed lower bound.” Independent claims 39, 50, and 61 have been amended to recite “determining whether current estimates of the posterior distributions of the modeling parameters are satisfactorily optimized in relation to a predetermined criterion.” No new matter has been added; the Examiner’s attention is directed to at least page 17, lines 3-12, of the Applicant’s specification as originally filed.

Definiteness of claim language must be analyzed in light of: a) the content of the application disclosure, b) the teachings of the prior art, and c) the claim interpretation by

one of ordinary skill in the art at the time of invention (M.P.E.P. § 2173.02). The Applicant submits that the “threshold amount” or “predetermined criterion” would be understood by one skilled in the art in light of the specification.

The Office Action states that the term “tractable” is also relative and ambiguous, and therefore renders the claims 1-70 indefinite.

The Applicant submits that when the term “tractable” is read in context with the phrase “tractable approximation,” claims 1-70 meet the requirements of definiteness under §112P2. The Applicant submits that one skilled in art would understand what is claimed by the claim language “tractable approximation” when read in light of the Applicant’s specification.

In view of the above, the Applicant submits that the instant § 112P2 rejections as to indefiniteness have been overcome. Accordingly, the Applicant respectfully requests that the indefiniteness rejections be withdrawn.

**Claims 1-70 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting an essential step of optimization.**

Independent claims 1, 14, and 27 have been amended to recite “determining if the lower bound has been satisfactorily optimized, wherein the lower bound is satisfactorily optimized when the computed lower bound has changed less than a threshold amount from a previously computed lower bound.” Independent claims 39, 50, and 61 have been amended to recite “determining whether current estimates of the posterior distributions of the modeling parameters are satisfactorily optimized in relation to a predetermined criterion.” The Applicant submits that independent claims 1, 14, 27, 39, 50, and 61 recite determining optimization by comparison to a threshold amount or predetermined criterion. Accordingly, the Applicant respectfully requests that the §112P2 rejections for omitting an essential step of optimization be withdrawn.

**Claim Rejections under 35 U.S.C. 102 and 103**

Claims 1-11, 14-24, 27-36, and 39-70 are rejected under 35 U.S.C. 102(b) as being anticipated by Heckerman (US 5,704,018). Claims 12-13, 25-26, and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heckerman (US 5,704,018) and further in view of Official Notice.

Claim 1 as presently amended expressly recites (emphasis added):

A method comprising:

selecting a modeling parameter from a plurality of modeling parameters characterizing a mixture of Student distribution components;

computing a tractable approximation of a posterior distribution for the selected modeling parameter based on an input set of data and a current estimate of a posterior distribution of at least one unselected modeling parameter in the plurality of modeling parameters;

computing a lower bound of a log marginal likelihood as a function of current estimates of the posterior distributions of the modeling parameters, the current estimates of the posterior distributions of the modeling parameters including the computed tractable approximation of the posterior distribution of the selected modeling parameter; ~~and~~

determining if the lower bound has been satisfactorily optimized, wherein the lower bound is satisfactorily optimized when the computed lower bound has changed less than a threshold amount from a previously computed lower bound;

generating a probability density modeling the input set of data, the probability density including the mixture of Student distribution components, the mixture of Student distribution components being characterized by the current estimates of the posterior distributions of the modeling parameters, if the lower bound is satisfactorily optimized;  
and

outputting the probability density.

Heckerman is directed to generating improved belief networks. The Examiner cites Heckerman col. 2, lines 5-23, which discusses discrete and continuous variable types. The Examiner also cites Heckerman, col. 7, lines 14-27, which discusses Bayes' theorem. However, these citations in Heckerman fail to disclose "generating a probability density modeling the input set of data, the probability density including the mixture of Student distribution components, the mixture of Student distribution components being characterized by the current estimates of the posterior distributions of

the modeling parameters, if the lower bound is satisfactorily optimized” as expressly claimed by the Applicant.

Thus, Heckerman fails to disclose at least one of the expressly recited limitations of claim 1. Accordingly, claim 1 is not anticipated by Heckerman. Independent claims 14, 27, 39, 50, and 61 distinguish for at least the same reason as claim 1. Claims 2-13, 15-26, 28-38, 40-49, 51-60, and 62-70 are dependent claims and distinguish for at least the same reasons as their independent base claims in addition to adding further limitations of their own. Therefore, the Applicant respectfully requests that the instant § 102 and § 103 rejections to claims 1-70 be withdrawn.

### **Conclusion**

Accordingly, in view of the above amendment and remarks it is submitted that all the rejections and/or objections to the application have been overcome. Based on the foregoing, Applicant respectfully requests that the application be allowed, and that a timely Notice of Allowance be issued in this case. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is invited to call the Applicant’s attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension of time fee that is not covered by an enclosed payment, please charge any deficiency to Deposit Account No. 50-0463. Any overpayment may be credited to the same account.

Respectfully submitted,  
Microsoft Corporation

Date: April 20, 2007

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I hereby certify that this correspondence is being electronically deposited with the USPTO via EFS-Web on the date shown below:

April 20, 2007  
Date

/Kate Marochkina/  
Signature

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